

Yiduo Andy Liu

Department of Earth and Atmospheric Sciences, University of Houston
Rm 312, Science & Research 1, Houston, TX 77204-5007
yliu59@uh.edu | (832) 544-9038

Research Interests

My research is centered on the structure and tectonics of East Asia and western North America at the outcrop, orogen, and plate scales. In particular, I am interested in:

- (1) Plate reconstruction using geological and geophysical constraints from the surface to lower mantle;
- (2) Flat-slab subduction-induced shortening and extension;
- (3) Slab stagnation and related intraplate volcanism;
- (4) Crustal deformation and exhumation in eastern Tibet.

Education

Ph.D. Geology, University of Houston, Houston, Texas, USA, 2016
M.S. Geology, Chinese Academy of Sciences, Beijing, China, 2011
B.S. Geology, Peking University, Beijing, China, 2007

Professional Appointment

Postdoctoral Fellow, University of Houston, Houston, Texas, USA, 2017-Present

Teaching

Structural Geology (2012, 2013, 2014, 2015, 2016)
UH-YBRA Geology Field Camp (2013, 2014, 2015, 2016)
Mineralogy (2014, 2016)
Environmental Geology (2013)
Igneous and Metamorphic Petrogenesis (2012)

Grants

2016 GSA Student Research Grant, Robert D. Hatcher Research Award
Geometry and kinematics of the oblique border faults in the Tusas Mountain segment, Rio Grande rift, northern New Mexico, \$2314.

2016 AAPG Foundation Grants-in-Aid, J. Elmer Thomas (Past-Presidents) Memorial Grant
Topological and geometrical characterization of fracture networks in the Sheep Mountain Anticline, Wyoming, \$1750.

2015 AAPG Foundation Grants-in-Aid, SEAPEX Named Grant
Fault kinematics and extension direction in the oblique Rio Grande rift, north-central New Mexico, \$1000.

2015 GCAGS (Gulf Coast Association of Geological Societies) Student Grant
Origin of the Late Cretaceous igneous rocks along the northern Gulf of Mexico margin, \$1500.

Publications (* corresponding author)

- Lu, R., **Liu, Y.**, Xu, X., Tan, X., He, D., Yu, G., Cai, M., and Wu, X., 2019. Three-dimensional model of the lithospheric structure of the eastern Tibetan Plateau: Implications for the active tectonics and seismic hazards. *Tectonics*, *in press*, doi: 10.1029/2018TC005239.
- Liu, Y.**, Murphy, M.A., Van Wijk, J., Koning, D.J., Smith, T., and Andrea, R.A., 2019. Progressive Opening of the Northern Rio Grande Rift based on Fault Structure and Kinematics of the Tusas-Abiquiu Segment in North-Central New Mexico, U.S. *Tectonophysics*, 753, 15-35, doi: 10.1016/j.tecto.2019.01.004.
- Tan, X., **Liu, Y.***, Lee, Y.-H., Lu, R., Xu, X., Suppe, J., Shi, F., and Xu, C., 2019. Parallelism between the maximum exhumation belt and the Moho ramp along the eastern Tibetan Plateau margin: Coincidence or consequence?. *Earth and Planetary Science Letters*, 507, 73-84, doi: 10.1016/j.epsl.2018.12.001.
- Tan, X., Yue, H., **Liu, Y.**, Xu, X., Shi, F., Xu, C., Ren, Z., Shyu, J. B. H., Lu, R., and Hao, H., 2018. Topographic loads modified by fluvial incision impact fault activity in the Longmenshan thrust belt, eastern margin of the Tibetan Plateau. *Tectonics*, 37, 3001-3017, doi: 10.1029/2017TC004864.
- Tan, X.-B., Xu, X.-W., Lee, Y.-H., Lu, R.-Q., **Liu, Y.**, Xu, C., Li, K., Yu, G.-H., and Kang, W.-J., 2017. Late Cenozoic thrusting of major faults along the central segment of Longmen Shan, eastern Tibet: Evidence from low-temperature thermochronology. *Tectonophysics*, 712-713, 145-155, doi: 10.1016/j.tecto.2017.05.016.
- Sun, D., Ji, J., **Liu, Y.**, Li, B., Chen, J., and Zhong, D., 2013. Detrital apatite fission track analysis and geomorphologic evolution of the Nujiang River area. *Chinese Journal of Geology*, 48(2), 501-514.
- Gong, J., Ji, J., Chen, J., Sang, H., Li, B., **Liu, Y.**, and Han, B., 2008. The $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology studies of rocks in eastern Himalayan syntaxis. *Acta Petrologica Sinica*, 24(10), 2255-2272.

Manuscripts in revision and preparation (* corresponding author)

- Liu, Y.**, Murphy, M.A., Snow, J., Van Wijk, J.W., and Cannon, J.M. Post-breakup magmatism in the northern Gulf of Mexico. *Earth-Science Reviews*, *in revision*.
- Tan, X., Lee, Y.-H., Xu, X., **Liu, Y.**, and Lu, R. Late Cenozoic faulting history of the central Longmenshan thrust belt and its tectonic implications. *Springer Book*, *in revision*.
- Li, Y., Lu, R., He, D., Wang, X., **Liu, Y.**, Xu, X., Tan, X., and Cai, M. Transformation of coseismic faults in the northern Longmenshan tectonic belt, eastern Tibetan Plateau: Implications for potential earthquakes and seismic risks. *Journal of Asian Earth Sciences*, *in revision*.
- Smith, T., Sundell, K., Johnston, S., Andrade, C. G., Andrea, R., Dickinson, J., **Liu, Y.**, Murphy, M., Lapen, T., and Saylor, J. Drainage reorganization and Laramide tectonics in north-central New Mexico and their downstream effects in the Gulf of Mexico. *Basin Research*, *in revision*.
- Liu, Y.**, and Suppe, J. The “Paleo-Pacific” subduction top to bottom: Insights from 3-D mapping of remnant slabs in the lower mantle and Mesozoic igneous record in East Asia. *In prep*.
- Liu, Y.**, and Suppe, J. A giant flat-slab subduction event in Northeast Asia during the Mesozoic. *In prep*.
- Liu, Y.**, and Suppe, J. Divergent double subduction of the Meso-Tethyan Bangong-Nujiang oceanic lithosphere under India and Tibetan Plateau uncovered by newly-mapped lower-mantle slabs. *In prep*.
- Tan, X., **Liu, Y.***, Yue, H., Suppe, J., Lu, R., Shi, F., and Xu, X. Two types of recess structures regulate two different characteristic earthquakes in active orogenic belts: Examples from the 2008 Wenchuan and the 2015 Nepal earthquakes. *In prep*.

Li, L.*, **Liu, Y.***, Li, A., Li, Y., Fu, Y.V., and Tan, X. Plume-lithosphere interactions recorded by frozen-in anisotropy underneath the Emeishan Large Igneous Province. *In prep.*

Conference Abstracts

- Li, L. and **Liu, Y.**, 2019. Frozen-in anisotropy in Emeishan large Igneous Province and its implication for Plume-lithosphere interaction. EGU General Assembly, Vienna, Austria. (Poster)
- Liu, Y.** and Suppe, J., 2018. What exactly is the “Paleo-Pacific plate” in East Asia? 3-D mapping of the remnant slabs in the lower mantle and their connections with the Mesozoic subduction and accretion history in East Asia. AGU Fall Meeting, Washington, D.C. (Oral)
- Liu, Y.** and Suppe, J., 2018. Subduction polarity and history of the Meso-Tethyan Bangong-Nujiang Ocean between the Qiangtang and Lhasa blocks. GSA Annual Meeting, Indianapolis, IN. (Poster)
- Liu, Y.** and Suppe, J., 2018. 3-D mapping of the remnant slabs: The “Paleo-Pacific Plate” in the lower mantle under East Asia and implications for plate reconstruction of the Mesozoic East Asia. GSA Annual Meeting, Indianapolis, IN. (Oral)
- Liu, Y.**, Murphy, M.A., Snow, J.E., van Wijk, J.W., Cannon, J.M., Parsons, C., 2017. Tectonic Mechanism for the Mid-Cretaceous – Early Paleogene Intraplate Magmatism from the Gulf of Mexico to Northwestern Canada. AGU Fall Meeting, New Orleans, LA. (Poster)
- Liu, Y.**, Murphy, M.A., van Wijk, J.W., Andrea, R.A., 2017. Rift initiation and evolution recorded in the oblique Tulas-Abiquiu segment of the Rio Grande rift, north-central New Mexico. GSA Annual Meeting, Seattle, WA. (Oral)
- Liu, Y.**, Murphy, M.A., 2017. Initiation and evolution of the northern Rio Grande rift, north-central New Mexico. GeoPRISMS Rift Initiation and Evolution Workshop, Albuquerque, NM. (Poster)
- Liu, Y.**, Murphy, M.A., Andrea, R.A., 2015. Slip re-orientation in the oblique Abiquiu embayment, northern Rio Grande rift. AGU Fall Meeting, San Francisco, CA. (Poster)
- Liu, Y.**, Andrea, R.A., Murphy, M.A., 2015. Using topology to characterize fracture network in a normal fault splay zone in the Rio Grande rift, New Mexico. GSA Annual Meeting, Baltimore, MD. (Oral)
- Liu, Y.**, Murphy, M.A., van Wijk, J.W., Cannon, J.M., Snow, J.E., Anderson, P.Z., Yao, Y., 2015. Origin of Late Cretaceous igneous activity in the northern Gulf of Mexico basin. GSA Annual Meeting, Baltimore, MD. (Poster)
- Liu, Y.**, Murphy, M.A., van Wijk, J., Snow, J.E., Anderson, P.Z., Cannon, J.M., Yao, Y., Luebbert, C., 2015. Slab tearing as an alternative mechanism for the Cretaceous igneous activity in the northern Gulf of Mexico region. GCAGS Annual Meeting, Houston, TX. (Poster)
- Liu, Y.**, Murphy, M.A., Cannon, J.M., van Wijk, J., Yao, Y., Snow, J.E., Anderson, P.Z., 2015. Post-rift magmatism at passive margins: an integrated study of Late Cretaceous igneous activity in the northern Gulf of Mexico. AAPG Annual Convention & Exhibition, Denver, CO. (Poster)
- Liu, Y.**, Murphy, M.A., Cannon, J.M., 2014. Post-rift alkaline magmatism along the northern Gulf of Mexico margin. AGU Fall Meeting, San Francisco, CA. (Oral)
- Liu, Y.**, Murphy, M.A., O’Keeffe, K., 2014. The Influence of pre-existing structures on the initiation of an oblique rift: the Cañones fault zone in north-central New Mexico. AAPG Annual Convention & Exhibition, Houston, TX. (Poster)
- Liu, Y.**, Murphy, M.A., O’Keeffe, K., Khadeeva, A., 2013. Oblique extension and basinward tilting along the Cañones fault zone, west margin of the Rio Grande rift. GSA Annual Meeting, Denver, CO. (Oral)

Field Experience

Brittle deformation in the Danba Anticlinorium, eastern Tibetan Plateau, Sichuan, China, 09/2018
Stratigraphy of the Galisteo-El Rito Basin in north-central New Mexico, 09/2016
Kinematics of normal and reverse faults in the Tusas Mountains, northern New Mexico, 08/2016
Structural analysis of the South Tibetan normal fault system in central Himalaya, Nepal, 05~06/2016
Geometry and kinematics of normal faults and fractures in the northern Rio Grande rift, New Mexico, 06/2015
Geologic mapping along the Cañones fault, Rio Grande rift, New Mexico, 05/2013
Yellowstone-Bighorn Research Association geology field camp, Montana-Wyoming, 2013, 2014, 2015, 2016
Geologic mapping in various areas in Big Bend National Park, Texas, 2012, 2013, 2014, 2015, 2016
Ductile deformation in the eastern Sierra Nevada, California, 07~08/2012
Fault damage zone analysis along the Cañones fault, north-central New Mexico, 05/2012
Ductile deformation in metamorphic rocks of Namche Barwa, easternmost Himalaya, Xizang, China 05/2009
Cenozoic crustal deformation along the Ailao Shan-Red River Shear Zone, Yunnan, China, 10/2008
Alluvial terraces sampling and OSL dating along major rivers in SE Tibetan Plateau, Xizang, China, 05/2008
Intraplate volcanism in the Changbai Shan volcanic field, NE China, 07~08/2007

Laboratory Experience

Geodetic seismic tomography interpretation and modeling, University of Houston, 2017-2019
In situ analysis of zircon U-Pb and Lu-Hf isotopes using MC-LA-ICPMS, Chinese Academy of Sciences, 2010
Zircon U-Pb dating, Beijing SHRIMP Center, 2009
Apatite fission track dating, Peking University, 2007
Conventional step-heating $^{40}\text{Ar}/^{39}\text{Ar}$ laboratory, Peking University, 2005-2007

Honors and Awards

17th & 18th Annual Robert E. Sheriff Lecture, Best Poster Award, 2015 & 2016
GCAGS Student Poster Contest Award, Third Place, 2015
Estwing Award for Outstanding Field Geology, University of Houston, 2015 & 2013
BP Scholarship for Graduate Work in Geosciences, University of Houston, 2015
Hess Corporation Scholarship for Graduate Work in Geosciences, University of Houston, 2014
Marathon Oil Scholarship for Graduate Work in Geosciences, University of Houston, 2013 & 2012
Science Laboratory Construction Award, Peking University, 2007

Services

Reviewer for Journal of Geophysical Research: Solid Earth (2019), International Journal of Disaster Risk Reduction (2018), and AAPG Special Publications (2016)
Convener, session "Present-Day and Ancient Flat-Slab Subduction in Rock Records, Geophysical Images, and Geodynamic Models", GSA Annual Meeting, Phoenix, AZ, 2019.
OSPA Judge, AGU Fall Meeting, Washington, D.C., 2018
Co-chair, East Asia Tectonic and Geodynamic History since the Mesozoic III Posters, AGU Fall Meeting, Washington, D.C., 2018
Co-convener and abstract reviewer, Session T020, Beyond Rigid Plates: Investigating mechanisms, processes, and products of intraplate deformation, AGU Fall Meeting, New Orleans, LA, 2017

Communications Chair, AAPG Petroleum Structure & Geomechanics Division (PSGD), 2015-2016
President, AAPG Student Chapter at University of Houston, 2015-2016
Vice President, AAPG Student Chapter at University of Houston, 2014-2015
Abstract reviewer & poster judge, AAPG annual conference, 2014, 2015, 2016
Student Research Day Committee, EAS Department, University of Houston, 2013-2015

External Trainings

Structure from Motion (SfM) Photogrammetry for Earth Science Research and Education, GSA, 10/2017
Practical Salt Tectonics, AAPG, 12/2015
Statistical treatment of structural geology data using R, GSA, 10/2015
Petroleum system of the Laramide Rockies, Wyoming, AAPG, 06/2015
Seismic amplitude interpretation, AAPG, 03/2015
Rock/fluid interactions and natural fracture development, AAPG, 11/2014
Practical geomechanics, AAPG, 11/2014
Balanced cross sections and kinematic restorations using 2D Move, AAPG Wildcatters, 08/2014
ArcGIS data management, PetroSkills, 08/2014
Geophysical methods for estimating geomechanical properties, AAPG, 02/2014
Move software training, Midland Valley, 02/2013

Professional Affiliations

American Geophysical Union, Geological Society of America, American Association of Petroleum Geologists

Activities

Captain, Peking University Alumni Association in Houston Dragon Boat Team, 2016-2017
Assistant Coach, Peking University Baseball Team, 2007-2010
Captain, Peking University Baseball Team, 2005-2007